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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/254,118	05/19/1999	KOHEI TATSUMI	52433/544	6494
26646	7590	06/09/2004	EXAMINER	
KENYON & KENYON ONE BROADWAY NEW YORK, NY 10004			CHAMBLISS, ALONZO	
			ART UNIT	PAPER NUMBER
			2827	

DATE MAILED: 06/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/254,118

Applicant(s)

TATSUMI ET AL.

Examiner

Alonzo Chambliss

Art Unit

2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 and 6-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 6-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. The amendment filed on 4/5/04 has been fully considered and made of record in Paper no. 25.

Response to Arguments

2. Applicant's arguments with respect to claims 1-4 and 6-11 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
2. Claim 10 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
3. In claim 10, the phrase “ the ball metal intervening between the substrate metal and the ball metal ” is vague and indefinite since the language is confusing because the ball metal can be intervening between the substrate metal and the ball metal.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1 and 2 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Boyd et al. (EP 582375).

With respect to Claim 1, Boyd teaches arranging metal balls 202 (i.e. metal solder particles) at selected portions 302 that are located at selected portions of a substrate 301 for mounting semiconductor devices (i.e. integrated circuits) thereon. Boyd teaches metal balls .125mm (i.e. 125 micrometers), wherein the metal balls 202 are adhered to the selected portions 302. The metal balls 202 are melted to form a plated layer (i.e. a metal diffusion) thermally diffused with the selected portions 302 of the substrate 301 for electronic devices with a different metal with no plating solutions used (i.e. heating). The metal is inherently different since the metal balls are melted and the selected portions remain in a solid state. Thermally diffusion means using heat in a diffusion bonding process for joining metals by using only heat and pressure to achieve atomic bonding (see col. 1 lines 1-7, col. 3 lines 25-30, col. 4 lines 39-48; Figs. 3-5).

With respect to Claim 2, Boyd teaches provisionally arranging and holding the metal balls 202 on a surface of an arrangement base plate 211 having through holes provided at positions mounting electronic devices. The surface of the arrangement base plate 211 facing downward during the provisionally arranging and holding procedure. The base plate 211 is transferred above the substrate 301 for mounting electronic devices. The metal balls 202 are provisionally adhered and held by the through holes to the portions 302 to be plated (see Figs. 2-5).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 3, 4, 6-8,10, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Boyd et al. (EP 582375) as applied to claim 1 above, and further in view of Tatumi et al. (U.S. 5,765,744) and Hoebener et al. (U.S. 5,492,266).

With respect to Claims 3 and 4, Boyd fails to disclose provisionally arranging and holding procedure, wherein excess metal balls are adhered to the arrangement base plate, and removed by applying ultrasonic vibrations from the suction of the arrangement base plate, thereby provisionally arranging and holding the metal balls. However, Tatumi discloses provisionally arranging and holding procedure, wherein excess metal balls 11 are adhered to the arrangement base plate 31, and removed by

applying ultrasonic vibrations from the suction of the arrangement base plate 31, thereby provisionally arranging and holding the metal balls 11 (see col. 4 lines 14-24; Figs. 1a and 1b). Thus, Boyd and Tatumi have substantially the same environment of metal balls attached to a substrate by base plate. Therefore, it would have been obvious to incorporate ultrasonic vibrations to the base plate of Boyd, since the ultrasonic vibrations would remove unwanted metal balls attached to the base plate as taught by Tatumi.

With respect to Claim 6, Tatumi discloses wherein the metal balls 11 are made of Au (see col. 4 lines 49-51).

With respect to Claim 7 and 8, Tatumi discloses a substrate 21 for electronic device is an insulating resin or a ceramic material and the selected portion are wiring composed of copper. The balls 15 are held in holes 13 of base plate 11, which are connected to the wiring (see col. 1 lines 27-55). It is well known in the semiconductor industry to connect metal balls made of Sn to copper contacts as evident by Hoebener (see col. 1 lines 13-16).

With respect to Claims 10 and 11, Boyd teaches wherein the metal balls 202 are solder, wherein the metal balls 202 are melted by reflowing to selectively plate the selected portions 302 of the substrate 301 for electronic devices. The metal ball 202 intervening between the substrate metal 302 and the electronic devices (see col. 1 lines 1-8 and col. 2 lines 20-30; Figs. 3-5). It is well known in the semiconductor industry to have metal balls having a different material as the selected portion (i.e. contact as evident by Hoebener (see col. 1 lines 13-16).

8. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Boyd et al. (EP 582375) as applied to claim 1 above, and further in view of Kaneda et al. JP 63-232360).

With respect to Claim 9, Boyd fails to disclose wherein the substrate for electronic devices is a lead frame composed of copper and the leads of the lead frame are partially plated. However, Kaneda discloses wherein the substrate for electronic devices is a lead frame 1 composed of copper and the leads of the lead frame are partially plated (see English abstract and all figures). Boyd and Kaneda have substantially the same environment of a chip attached to a substrate by solder bumps. Therefore, it would have been obvious to substitute the lead frame for the substrate of Boyd, since the lead frame would provide a stable support for the chip connection as taught by Kaneda.

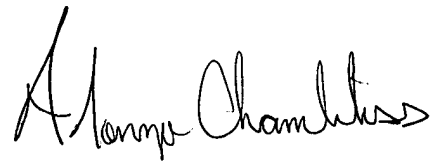
The prior art made of record and not relied upon is cited primarily to show the process of the instant invention.

Conclusion

9. Any inquiry concerning the communication or earlier communications from the examiner should be directed to Alonzo Chambliss whose telephone number is (703) 306-9143. The fax phone number for this Group is (703) 308-7722 or 7724.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-7956

AC/June 7, 2004

A handwritten signature in black ink, appearing to read "Alonzo Chambliss". The signature is fluid and cursive, with the first name "Alonzo" and last name "Chambliss" clearly distinguishable.

Alonzo Chambliss
Primary Patent Examiner
Art Unit 2827